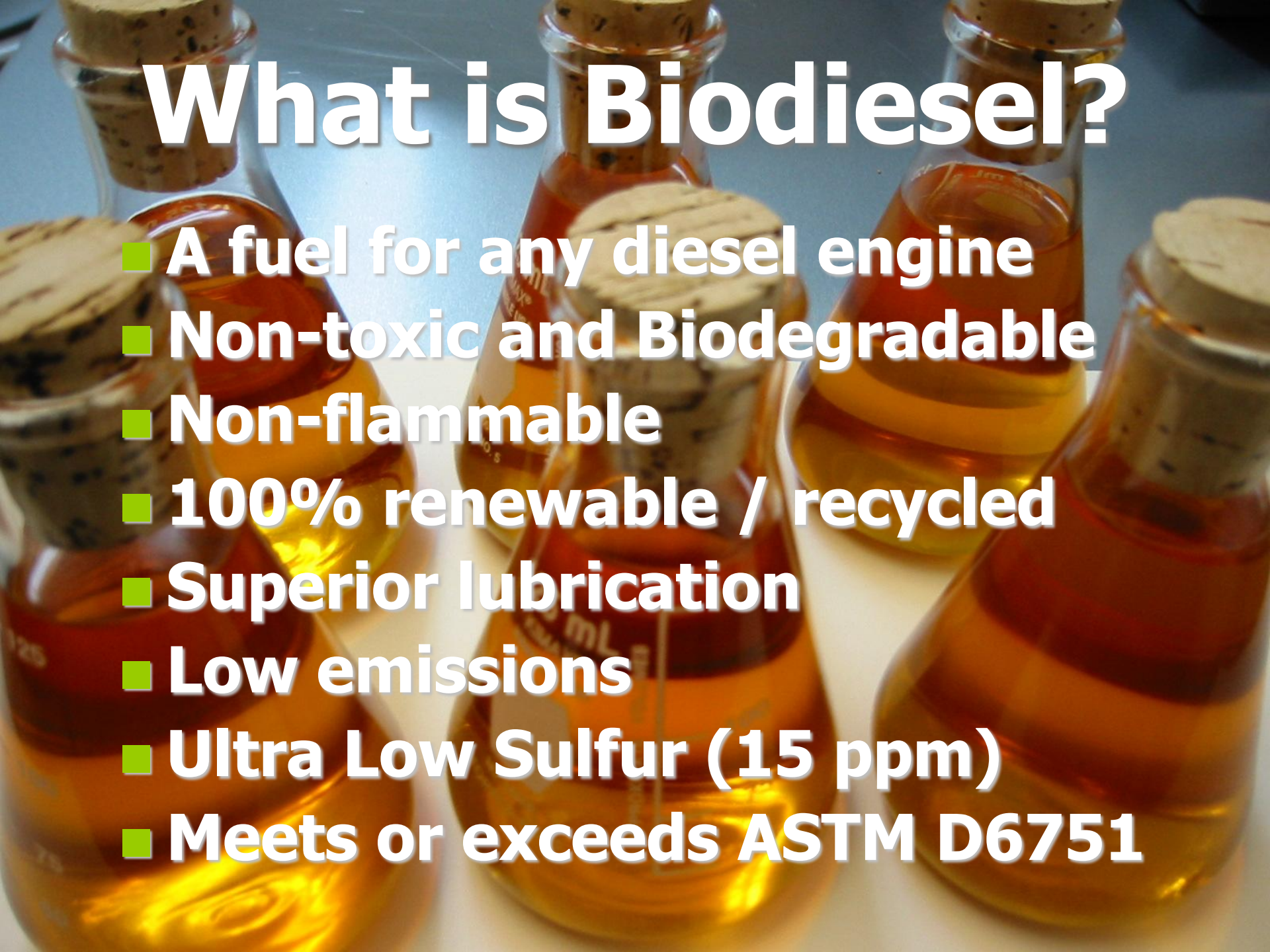

Renewable *and* Sustainable
Federal Utility Partnership
Working Group Meeting
April 20-21, 2011
Pacific Biodiesel, Inc.
Kelly King, VP

The Pacific Biodiesel Ohana



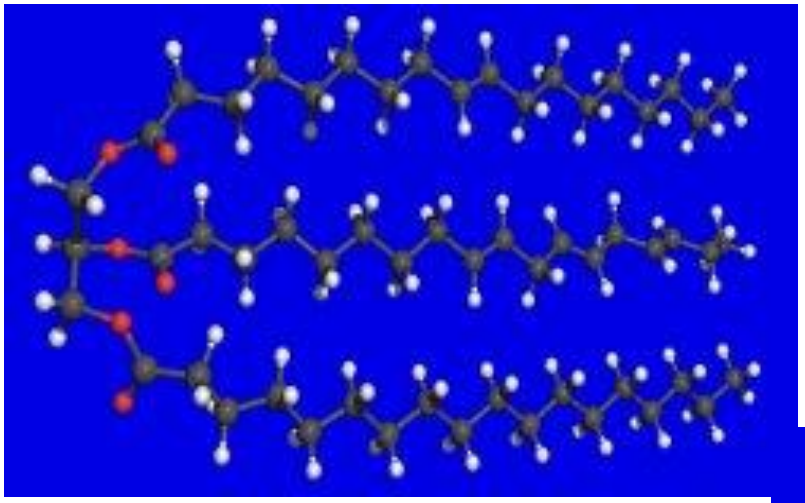
What is Biodiesel?

- A fuel for any diesel engine
- Non-toxic and Biodegradable
- Non-flammable
- 100% renewable / recycled
- Superior lubrication
- Low emissions
- Ultra Low Sulfur (15 ppm)
- Meets or exceeds ASTM D6751

What biodiesel is not:

- Biodiesel is not vegetable oil that has simply been filtered
- Biodiesel is not a fuel that requires costly modifications to your diesel engine
- Biodiesel itself does not contain any fossil fuel product (although it can be mixed with petroleum diesel at any percentage rate)
- Biodiesel does not involve gasification, micro-waves or pyrolysis
- Not made from starchy feedstock (ethanol)

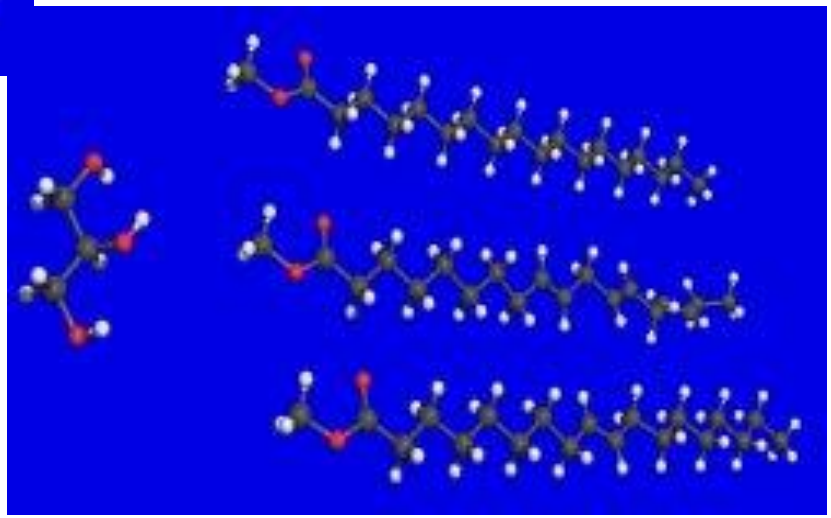
Vegetable oil to Biodiesel



Triglyceride Fat or Oil molecule

Biodiesel molecules

Glycerin molecule



Pictures provided by

Campa® als Kraftstoff

				
	Gasoline	**Biodiesel**	**Corn-derived Ethanol**	**Cellulosic Ethanol**
	Bad	**Good**	**Transitional**	**Potentially Great**
	A non-renewable fossil fuel produced by refining crude oil; emits large quanities of CO_2 upon combustion.	A renewable alternative to petroleum diesel produced from animal fat or vegetable oil.	The main source of ethanol in the U.S. But growing corn is energy-intensive and requires large amounts of fertilizer made with fossil fuel.	Production results in the same ethanol that corn produces, but the feedstocks, especially switchgrass, are inexpensive and easy to grow and the process of refining them is environmentally friendly.
Net Energy Balance *	N/A	3.20	1.34	2.62
Reduction in Greenhouse Gas Emissions	None (1 gallon produces 19 lbs of CO_2)	67.7%	21.8%	91%

** As technology advances and the processes are streamlined, experts expect greater efficiency and higher energy balance ratios. --* **Center for American Progress**

Benefits of Biodiesel

- Improved emissions over petroleum diesel:
  - 67% reduction in unburned hydrocarbons
  - 48% reduction in carbon monoxide
  - 47% reduction in particulate matter
  - 99% reduction in sulfates
  - 78% reduction in carbon dioxide (life cycle)
- Easy to use / Integrate:
  - No noticeable changes in power, economy
  - No costly vehicle or infrastructure modifications
  - Allows existing vehicle platforms to qualify as alternative fuel vehicles
  - Superior lubrication properties to petroleum diesel
  - Can be blended with petroleum diesel in any proportion

Biodiesel CO_2 Cycle

Up to 100% reduction in greenhouse gas CO_2

Renewable CO_2

Oil Crops

Use in Cars and Trucks

Biodiesel Production

Renewable Energy Portfolio

Wind
Solar
Geothermal
Biomass
Biofuels

Biodiesel Priorities

FARM EQUIPMENT

MASS TRANSIT

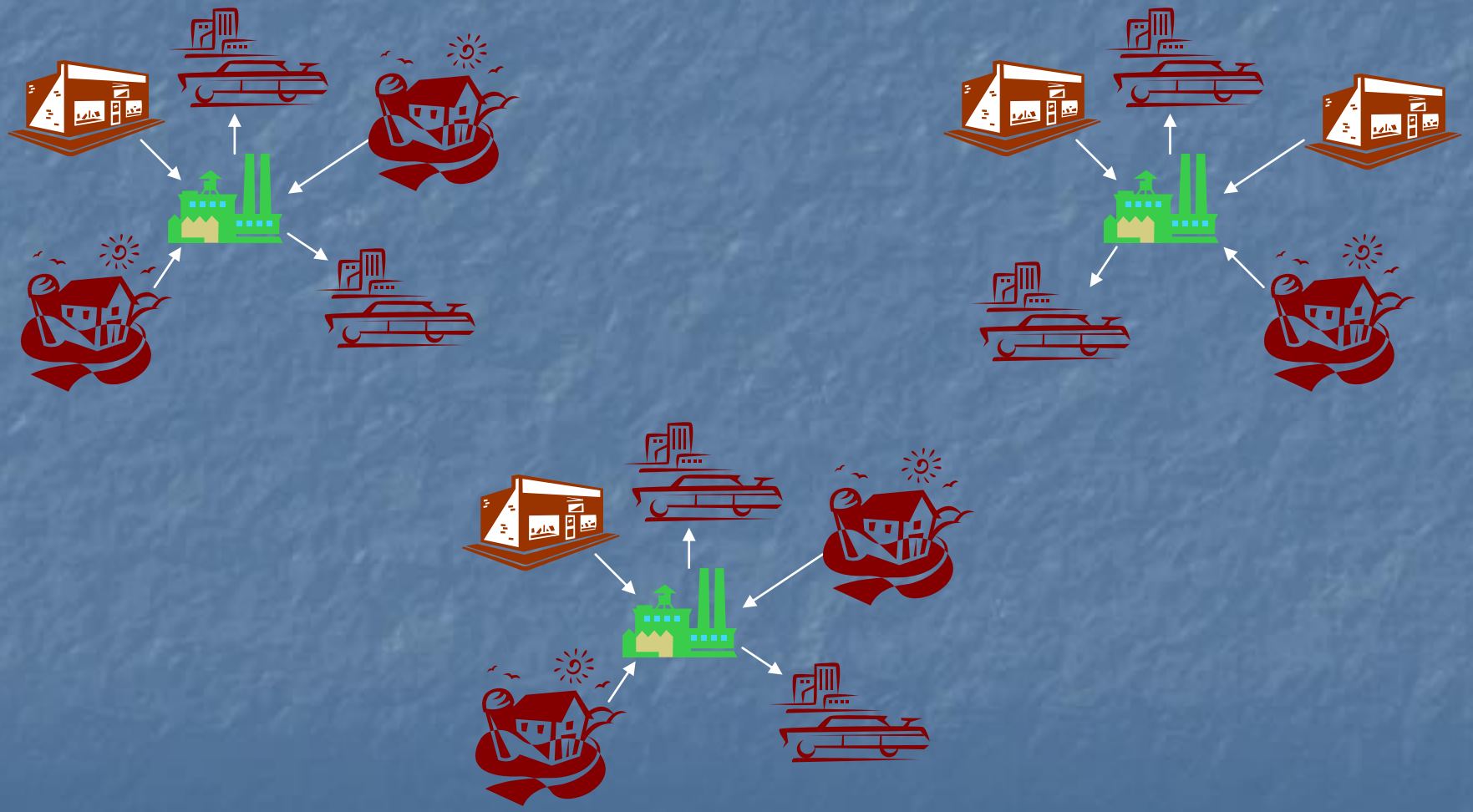
TRUCK FLEETS

EMERGENCY BACK-UP POWER

Sustainable Biodiesel Model

- Community-Based feedstock supply
  - Sequester all locally available waste oil and grease (includes animal fats)
  - Support local farmers (Food *and* Fuel)
- Expand processing capacity with increasing local feedstock supply
- Process fuel efficiently and environmentally
- Sell product locally
- Integrate with other renewable energy supplies for most appropriate use
- Develop co-products and high value sidestreams

Community Model



Benefits for the community

Waste Reduction and Diversion

26,000 tons / 6.8 million gallons per year
(grease trap and used cooking oil)

Local Economy

More jobs and new businesses
Stable fuel prices
90 cents per dollar stays in the community

Diversified Agriculture

Energy Security

HAPPY APRIL FUELS DAY!

Oregon
John A. Kitzhaber, MD, Governor

Department of Agriculture
635 Capitol St NE
Salem, OR 97301-2532

COPY

February 1, 2011

To: Retail Dealers, Nonretail Dealers, and Wholesale Dealers of Diesel Fuel in the State of Oregon.

NOTICE: Minimum Biodiesel Blending Requirement Increases to 5% By Volume (B5) Effective April 1, 2011.

If you are a retail dealer, nonretail dealer (e.g., card lock), or a wholesale dealer (e.g., fuel loading terminal or fuel distributor) of diesel fuel in the State of Oregon, this rule affects you.

Oregon's in-state biodiesel production capacity has reached at least 15 million gallons on an annualized basis. In compliance with Oregon's Renewable Fuel Standard [Ref. Oregon Revised Statute (ORS) 646.921 and ORS 646.922], effective April 1, 2011, all diesel fuel sold or offered for sale in Oregon must contain a minimum of 5% by volume biodiesel, creating a B5 biodiesel blend, except for 1) railroad locomotives, 2) marine engines, and 3) home heating applications.

COMMUNITY BIODIESEL MODEL

Early Pacific Biodiesel Plants

Maui 1996

Japan 1998

Virginia 2004

Oregon 2005

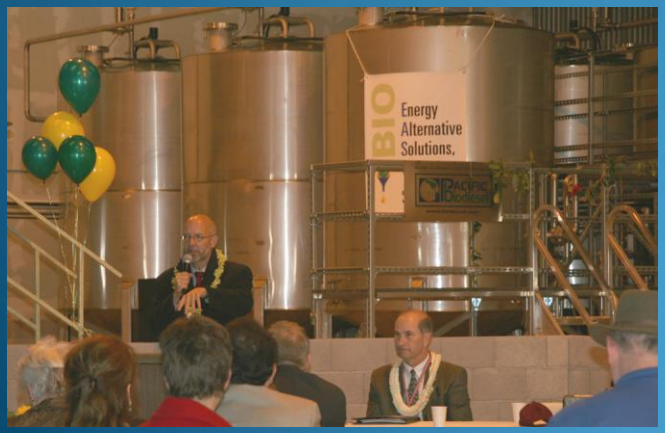
Pacific Biodiesel process plants (cont.)

Pennsylvania 2006

Maryland 2006

Texas 2006

California 2006



Oregon II 2008

Containerized Modular Unit

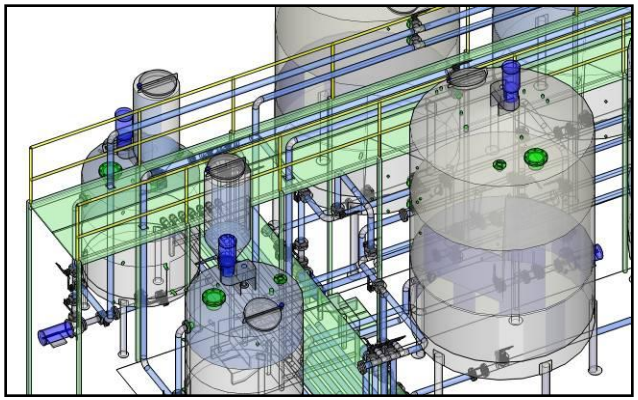
First Alaska Biodiesel Plant

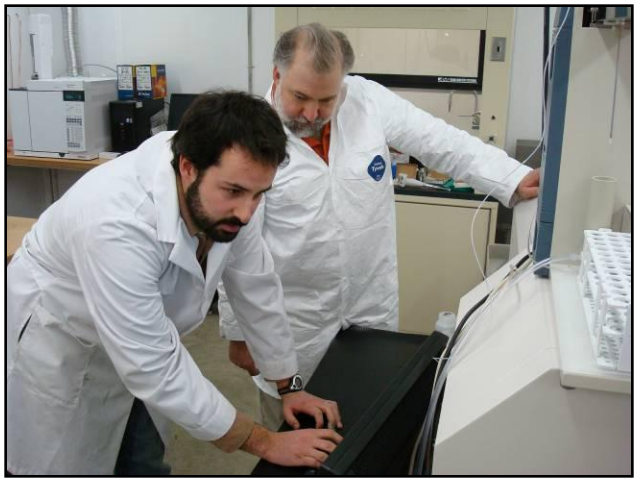
Sustainable Biodiesel Alliance

www.fuelresponsibly.org

Pacific Biodiesel Technologies

- Process Technology
  - Multi-feedstock biodiesel process technology
  - Process utilities and tank farm equipment
  - Feedstock collection and rendering equipment
  - Facility retrofits
- Laboratory Services
  - ASTM fuel testing
  - QC Program development
  - Process verification and optimization
- Research and Development
  - Contract R&D projects
  - Feedstock development
  - Pilot Plant verification





PACIFIC BIODIESEL TECHNOLOGIES

Professional Test Lab Facilities

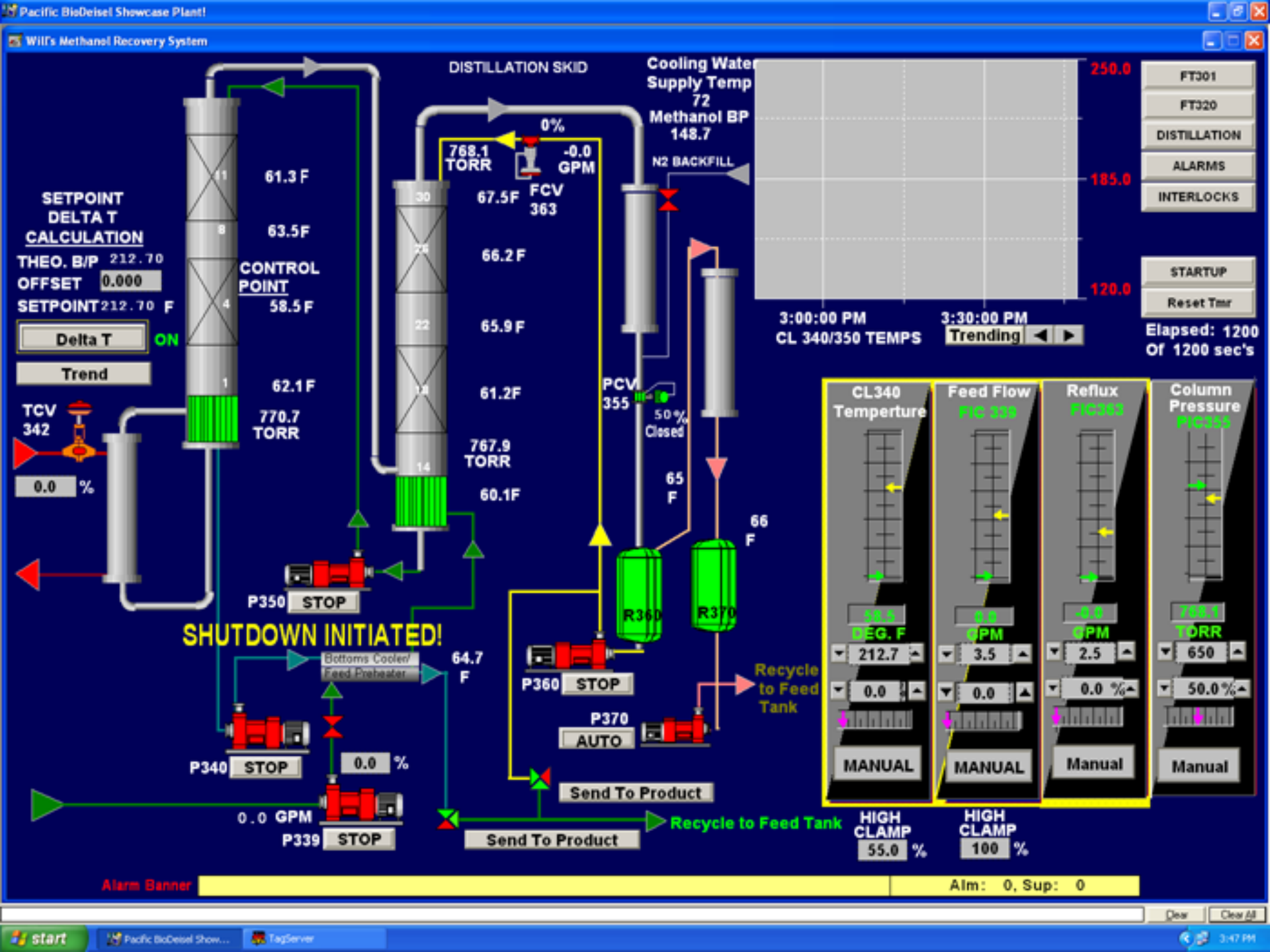
Fuel Testing/Research & Development

TECHNOLOGY:

Advances in scalable process

- Glycerin refinement
- Methanol recapture
- Waterless process
- Automated control system
- High vacuum distillation
- Efficient labor/energy costs

PACIFIC BIODIESEL TECHNOLOGIES


Pacific BioDeisel Showcase Plant!
Will's Methanol Recovery System
DISTILLATION SKID
Cooling Water Supply Temp 72
Methanol BP 148.7
N2 BACKFILL
0%
768.1 TORR
-0.0 GPM
67.5F
FCV 363
61.3 F
63.5F
66.2 F
65.9 F
61.2F
60.1F
62.1 F
770.7 TORR
767.9 TORR
SETPOINT DELTA T CALCULATION
THEO. B/P 212.70
OFFSET 0.000
SETPOINT 212.70 F
Delta T
ON
Trend
CONTROL POINT
58.5 F
TCV 342
0.0 %
PCV 355
50 % Closed
65 F
66 F
P350 STOP
SHUTDOWN INITIATED!
Bottoms Cooler/ Feed Preheater
64.7 F
P340 STOP
0.0 %
0.0 GPM
P339 STOP
R360
R370
P360 STOP
P370 AUTO
Send To Product
Recycle to Feed Tank
Send To Product
Recycle to Feed Tank
250.0
185.0
120.0
3:00:00 PM
3:30:00 PM
CL 340/350 TEMPS
Trending
FT301
FT320
DISTILLATION
ALARMS
INTERLOCKS
STARTUP
Reset Tmr
Elapsed: 1200
Of 1200 sec's
CL340 Temperture
58.5 DEG. F
212.7
0.0
MANUAL
Feed Flow
FIC 339
0.0 GPM
3.5
0.0
MANUAL
Reflux
FIC363
-0.0 GPM
2.5
0.0 %
Manual
Column Pressure
PIC355
768.1 TORR
650
50.0 %
Manual
HIGH CLAMP
55.0 %
HIGH CLAMP
100 %
Alarm Banner
Alm: 0, Sup: 0
start
Pacific BioDeisel Show...
TagServer
3:47 PM

Feedstock

- Technology must be multi-feedstock compatible
- Recover all useable waste grease first
- Encourage sustainably grown biofuel crops which utilize otherwise fallow agricultural land
- Source all feedstock locally
- Develop value-added products from biofuel crop by-product:
  - Meal for animal feed markets
  - Food for human consumption
  - Soil amendments
  - Soap and other oleo chemical products

FEEDSTOCK:

In-house trucking companies

PACIFIC BIODIESEL INCORPORATED

Cleanway Inc.

ENCORE OILS

2009 PARTICIPANT

RESTAURANTS FOR RENEWABLES™

Food, then Fuel!

Our cooking oil is locally recycled into renewable fuel to benefit our community & the planet.

Biofuel Crop Plan

Jatropha farm, Big Island

100 Days from “Soil to Oil”

Hawaii's Biomass Potential

Estimated Available Acreage for Biomass Production (Acres)

	Maui	Kauai	Oahu	Hawaii	Total
Stillwater/Kinoshita estimates	26,000	7,000	25,500	27,000	85,500
Land currently used for sugar production	36,700	11,100	0	0	47,800
Sub-total	**62,700**	**18,100**	**25,500**	**27,000**	**133,300**
Additional available prime farmland	0	35,500	15,300	30,000	80,800
Sub-total	**62,700**	**53,600**	**40,800**	**57,000**	**214,200**
Existing non-sugar agricultural production	9,300	3,000	17,300	11,800	41,400
Max potential (exclusive of non-sugar ag land)	**53,400**	**50,600**	**23,500**	**45,200**	**172,800**

2007 Hawaii Energy Strategy Report (Draft), 2/07

Hawaii Dept. of Business, Economic Development and Tourism (DBEDT)

Biodiesel By-products
Replacing petroleum products

By-product Uses

- Animal feed
- Soap and Oleochemical
- Fertilizer
- Energy

The price of going green …

Fuel prices at the Union 76 Station, Nimitz Highway Honolulu, Hawaii April 9, 2011

Success creates:

- **Permanent family wage jobs**
- **Agricultural renaissance (food *and* fuel)**
- **Economic gain (90 cents of every $ stays in community)**
- **Environmental security - decreased risk of catastrophic climate change associated with burning fossil fuel**
- **Energy security - sustainable, robust local fuel source**

PACIFIC BIODIESEL TECHNOLOGIES

Divert Your Course

This is the actual radio conversation of a US naval ship with Canadian authorities off the coast of Newfoundland in October 1995. Radio conversation released by the chief of naval operations, 10-10-95.

CANADIANS: **Please divert your course 15 degrees to the south to avoid a collision.**

AMERICANS: **Recommend you divert your course 15 degrees to the north to avoid a collision.**

CANADIANS: **Negative. You will have to divert your course 15 degrees to the south to avoid a collision.**

AMERICANS: **This is the captain of a US Navy ship. I say again, divert YOUR course.**

CANADIANS: **No. I say again, you divert YOUR course.**

AMERICANS: **This is the Aircraft Carrier US Lincoln, the second largest ship in the US Atlantic Fleet. We are accompanied with 3 Destroyers, 3 Cruisers and numerous support vessels. I DEMAND that you change your course 15 degrees north. I say again, that's one-five degrees north, or counter-measures will be undertaken to ensure the safety of this ship.**

CANADIANS:

This is a lighthouse. Your call.

In the final analysis
the Environment
is the lighthouse.